UBS

Risk management tools for the buy side

Risk management for the buy side has many similarities with that for the sell side, but there are also many significant differences. A buy-side risk management tool should be flexible enough to adapt to investment processes, rather than forcing a 'one-size-fits-all' approach. It should properly cover the range of assets required, including a full set of issuer spread curves with clean historical data. It should also enable proper risk analysis by providing comparison of performance achieved with risk taken, using the same factors

Investment risk

Much like trading books on the sell side, investment portfolios may be risk managed and monitored individually, in groups or across a whole institution. Good portfolio risk tools allow flexibility in portfolio structure and allow analyses at any level in that structure, including across legal entities. Risk managers should be able to answer questions ranging from "what is our total exposure to issuer XYZ across every firm in our group?", through to "what is the contribution to portfolio tracking error in this portfolio from spread curve moves in XYZ bonds in EUR?".

Like their sell-side counterparts, buy-side risk managers use value-at-risk (VaR) and scenario analysis (alongside exposures, rate and spread sensitivities, greeks, etc.) As well as providing a view of the evolution of risk on a portfolio over time, and providing metrics for reporting risk to clients and regulators, these can be useful tools for risk allocation across portfolios with very different asset types or investment methodologies.

VaR calculations for investment portfolios tend to use longer time horizons than trading portfolios, and it is important that risk tools for the buy side give flexibility in horizons and confidence levels to be used, as well as start/end dates and decay for historical data (if using historical simulation).

Scenario analysis tools should use full revaluation and should allow the definition of risk factor shocks dependent on certain identifier values, such as rating-specific credit spread movements or country-specific equity market shocks, and also provide for shocks to be adjusted for liquidity of holdings, as has been implemented by sell-side institutions post-crisis.

Relative risk

A major difference with buy-side risk is that portfolios are often managed relative to benchmarks or scheme liabilities, and so need relative risk measures such as: volatility of projected relative performance (*'ex-ante* tracking error'); potential under-performance in stress scenarios; and projected scheme funding levels (relative to

A. VaR and tracking error, by issuer and factor, for an example portfolio of three EUR sovereign bonds

Issuer	Factor	Portfolio VaR (EUR)	Tracking error (bp)
All	Total	31,607.4	20.0
All	Interest rate	24,116.5	1.1
All	Spread	30,272.4	19.9
Republic of Portugal	Spread	18,613.4	25.5
Kingdom of Spain	Spread	10,837.3	10.6
Republic of Austria	Spread	7,968.7	0.4

Source: UBS Delta

liabilities). As an example, table A shows *ex-ante* tracking errors.

For more on management relative to scheme liabilities in the context of regulatory capital for insurers, see our article *When is a hedge not a hedge? ALM under Solvency II* in *Life & Pension Risk*, September 2011 (*www.risk.net/2104091*).

Credit risk

On the sell side, 'credit risk management' traditionally focused on loan and counterparty risk, with credit default risk in the trading book covered separately under 'issuer risk' frameworks, although this distinction has been actively reduced following the financial crisis.

Among buy-side risk managers, however, 'credit risk' principally encompasses credit spread risk on investment portfolios (which would fall under 'market risk' on the sell side) as well as default risk.

To fully capture such credit spread risk, sell-side market risk managers find – and many on the buy side now agree – that a history of daily issuer spread curves, derived from cleaned bond price data, is needed. These can be aggregated up into market or rating curves but are also needed at the issuer level. This allows, for example, VaR or tracking error to be shown by issuer (see table A) but liabilities to be discounted using a market spread curve.

1 Risk factor breakdown of tracking error for an example benchmarked bond fund, alongside attribution of 32bp outperformance during July 2011 using the same risk factors
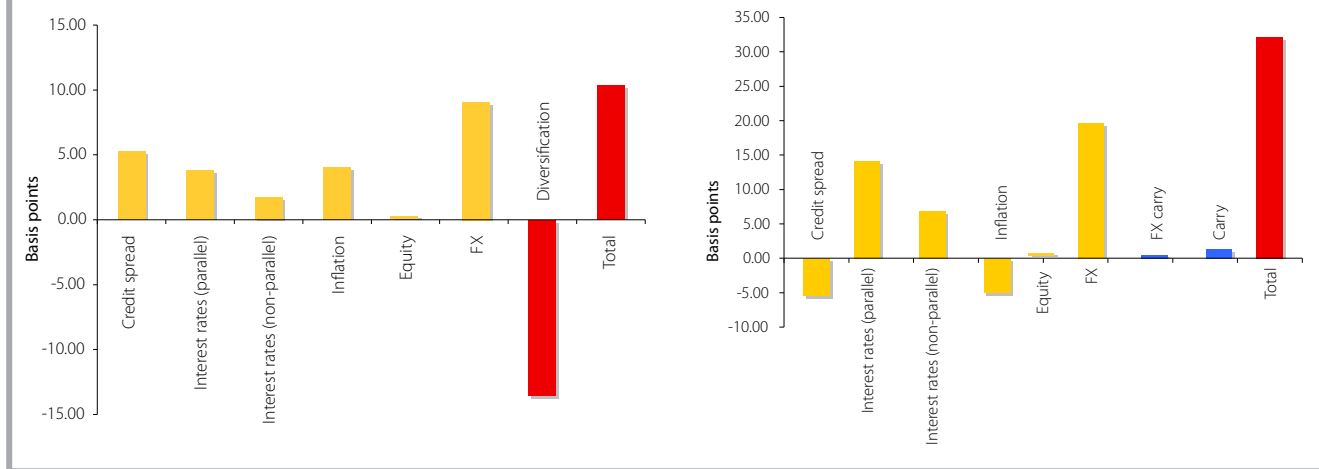
Counterparty risk

Issuer level data with portfolio aggregation tools will allow risk managers to answer concentration risk questions such as "what is our exposure to bank XYZ across all of the portfolios we manage?".

As well as exposure to XYZ as issuer of securities, such exposure may also arise from over-the-counter derivatives with XYZ as counterparty. Buy-side risk managers are learning from the experience of sell-side credit risk managers that current exposure to a counterparty does not tell you everything about such risk, and that it is important to model 'potential future exposure' under potential market moves. Also, events have shown that even 100% collateralised counterparty exposures may experience losses on default and that this residual risk should be managed. For more on this, see our article *Counterparty credit risk in portfolio risk management*, published in *Risk*, October 2010 (*www.risk.net/1742219*).

Liquidity risk

The crisis has shown the potential impact of (il)liquidity, and this has become a real focus for sell-side and buy-side risk managers alike. Sell-side institutions, by nature of their business, will tend to have more insight into liquidity of individual instruments. UBS Delta, a risk management tool used by the buy side, assigns a liquidity score (1–10) to every fixed income asset, based on amounts traded, quotes requested, bid-offer spread, and other metrics from UBS Investment Bank, put through a scoring algorithm to weight and normalise the scores.

Risk and performance

One area in which sell-side risk managers could have benefited from looking at the approach of the buy side is in the integration of risk and performance (or profit and loss). To properly understand risk-taking, risk managers should look closely at actual outcomes. To do this, risk and performance should be broken out and attributed using the same portfolio hierarchy structures and the same identifiers, which is best achieved by using the same tool for performance attribution as for risk analysis. Figure 1 shows an example of this, using high-level risk factor breakdown of both risk (tracking error) and performance (excess return). Additionally, providing clear commentary on how risk and performance relate is an important discipline that feeds back directly into effective risk management.

About UBS Delta

UBS Delta is UBS's award-winning portfolio analysis and risk management system. Clients use UBS Delta to measure and manage risk, attribute performance and optimise portfolios across asset classes. Risk measures include sensitivities, deltas and other greeks, VaR using both analytic and historic approaches, full revaluation scenario analysis as well as liquidity scoring and Solvency II metrics. These can be split out using both standard categories (for example, currency, asset class, issuer industry, maturity band, credit rating) and also user-defined identifiers (for example, portfolio manager, strategy, user-defined sector).

UBS Delta builds around 5,000 cleaned market, index, issuer, Libor, government and inflation curves every day, as well as supporting more than 200,000 bonds in over 35 currencies, credit default swaps on more than 4,500 entities, CDX/iTraxx indexes and about 150,000 equity names across various exchanges.

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